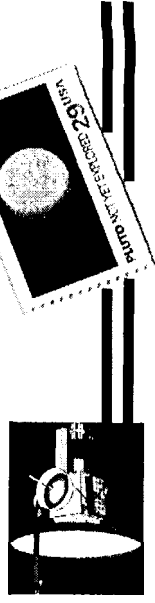
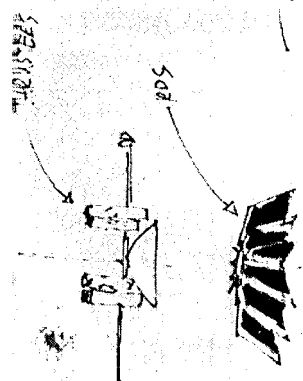


The Pluto Sciencecraft will send back data which will allow scientists to construct a mosaic of the surface features of Pluto and Charon.



# PLUTO EXPRESS

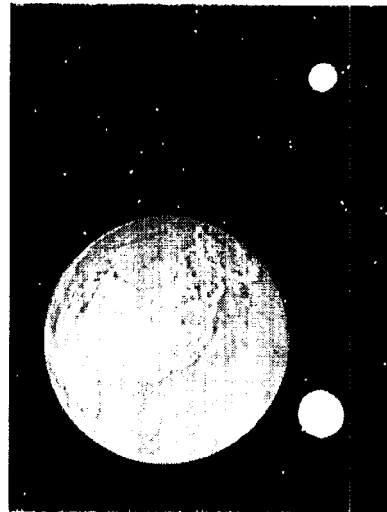


## NEW TECHNOLOGIES

The current version of the spacecraft would weigh (at launch) about 100 kilograms (220 pounds), making it smaller than the first interplanetary spacecraft, Mariner 2, launched in 1962. The Galileo spacecraft now in orbit around Jupiter, has a mass of 2200 kilograms. Yet the Pluto Express on-board flight computer, reduced to about the size of a small cassette recorder, will have 20 to 50 times the processing speed of the Galileo computer.

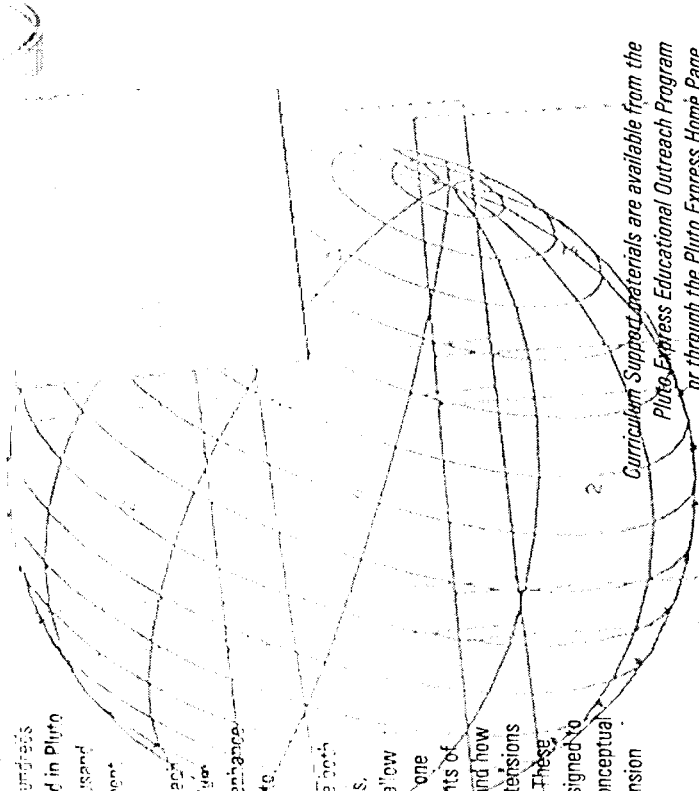
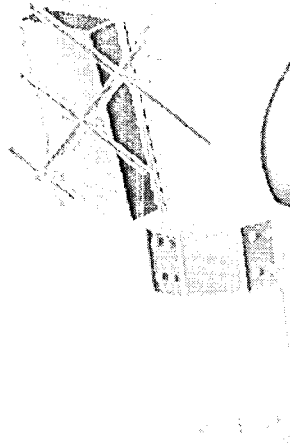
Nearly every part of the spacecraft represents a new generation of technology. The craft that will travel to Pluto is no longer considered a spacecraft, but rather is now referred to as a *Sciencecraft*.

This vehicle will be unlike its predecessors, where science instruments were attached onto a spacecraft bus and interfaced with the main computer. On Pluto Express, there is no such distinction. The integrated sciencecraft will cost less, have lower mass, and be easier to operate from Earth than today's outer solar system spacecraft, yet it will provide more data about Pluto than any other fast planetary probe.



For further *Pluto Express* information  
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 Jet Propulsion Laboratory  
 4800 Oak Grove Drive, #301-160L  
 Pasadena, CA 91109

Internet <http://www.jpl.nasa.gov/pluto/>  
 email: [pluto.education@jpl.nasa.gov](mailto:pluto.education@jpl.nasa.gov)  
 phone (818) 354-3812  
 fax (818) 393-3654



Curriculum Support Materials are available from the  
 Pluto Express Educational Outreach Program  
 or through the Pluto Express Home Page.

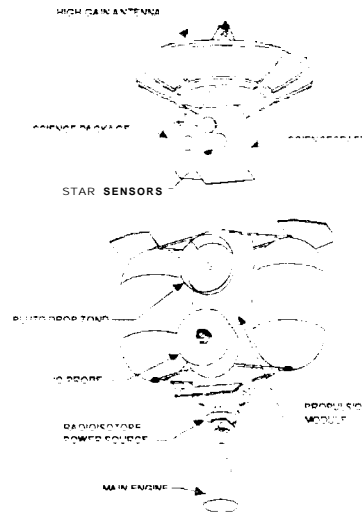
# Pluto Sciencecraft

—The only planet in the solar system not yet visited by our robotic spacecraft!

*Recent observations through the Hubble Space Telescope have given us a glimpse of Pluto and its moon Charon, but their small size and immense distance from Earth have preserved their mystery.*

*A Sciencecraft approach means that scientists and engineers work together with a high degree of communication, from the beginning!*

Pluto is the smallest, outermost and last-discovered planet in the Solar System and the only one that has never been visited by a spacecraft from Earth. Pluto and its relatively large satellite Charon are the destinations of a proposed Sciencecraft mission for the next decade, being developed for NASA by scientists and engineers at NASA's Jet Propulsion Laboratory (JPL). In the proposed mission, two lightweight Sciencecraft would be launched separately on trajectories to reach the Pluto-Charon system in  $\pm 3$  years.



The Sciencecraft integrates science objectives and engineering constraints to create a highly efficient spacecraft based on the need to take measurements with sophisticated sensors that probe the visible, infrared, ultraviolet, and radio regions of the electromagnetic spectrum. Scientific objectives for Pluto Express include global geological and chemical mapping of Pluto and Charon and study of Pluto's atmosphere. Mission designers will seek a possible extended mission to explore newly-discovered bodies in the Kuiper Disk beyond Pluto. ***This will help us understand more about the structure and early history of our Solar System.***

*The mission to Pluto represents not only innovation in technology and science, but a challenge to our imaginations as well. Students, teachers, engineers, and scientists are collaborating in this exciting endeavor.*

Near their closest approaches to Pluto, the sciencecraft will pass behind Pluto (as seen from Earth) to use the radio signal to study the planet's tenuous atmosphere. We don't know what we will find when we arrive, but the computer-enhanced view of recent Hubble photos shown above may give us a hint. It suggests active polar regions and variegated surface features that would be exciting to explore!

1. Discovery photos of Pluto taken by Clyde Tombaugh, 1930.
2. High-quality ground-based photo.
3. Hubble image, 1991.
4. Hubble image, 1994.
5. Latest Hubble image released March 7, 1996.

The cover of this brochure is a vision of two design students from the Art Center College of Design in Southern California done during a class where they explored design possibilities for the sciencecraft.